

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 February 2005 (17.02.2005)

PCT

(10) International Publication Number
WO 2005/015105 A1

(51) International Patent Classification⁷: **F28D 7/02**,
F28F 9/02

(21) International Application Number:
PCT/EP2004/051619

(22) International Filing Date: 27 July 2004 (27.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03077464.0 6 August 2003 (06.08.2003) EP

(71) Applicant (for all designated States except US): **SHELL
INTERNATIONALE RESEARCH MAATSCHAPPIJ
B.V.** [NL/NL]; Carel van Bylandtlaan 30, NL-2596 HR
The Hague (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FRIESE**,
Eckhard Heinrich Erich Otto [DE/DE]; Bunsen-
strasse 5, 51647 Gummersbach (DE). **VON KOS-
SAK-GLOWCZEWSKI**, Thomas Paul [DE/DE];
Bunsenstrasse 5, 51647 Gummersbach (DE). **PAPEN-
DICK**, Joachim [DE/DE]; Bunsenstrasse 5, 51647

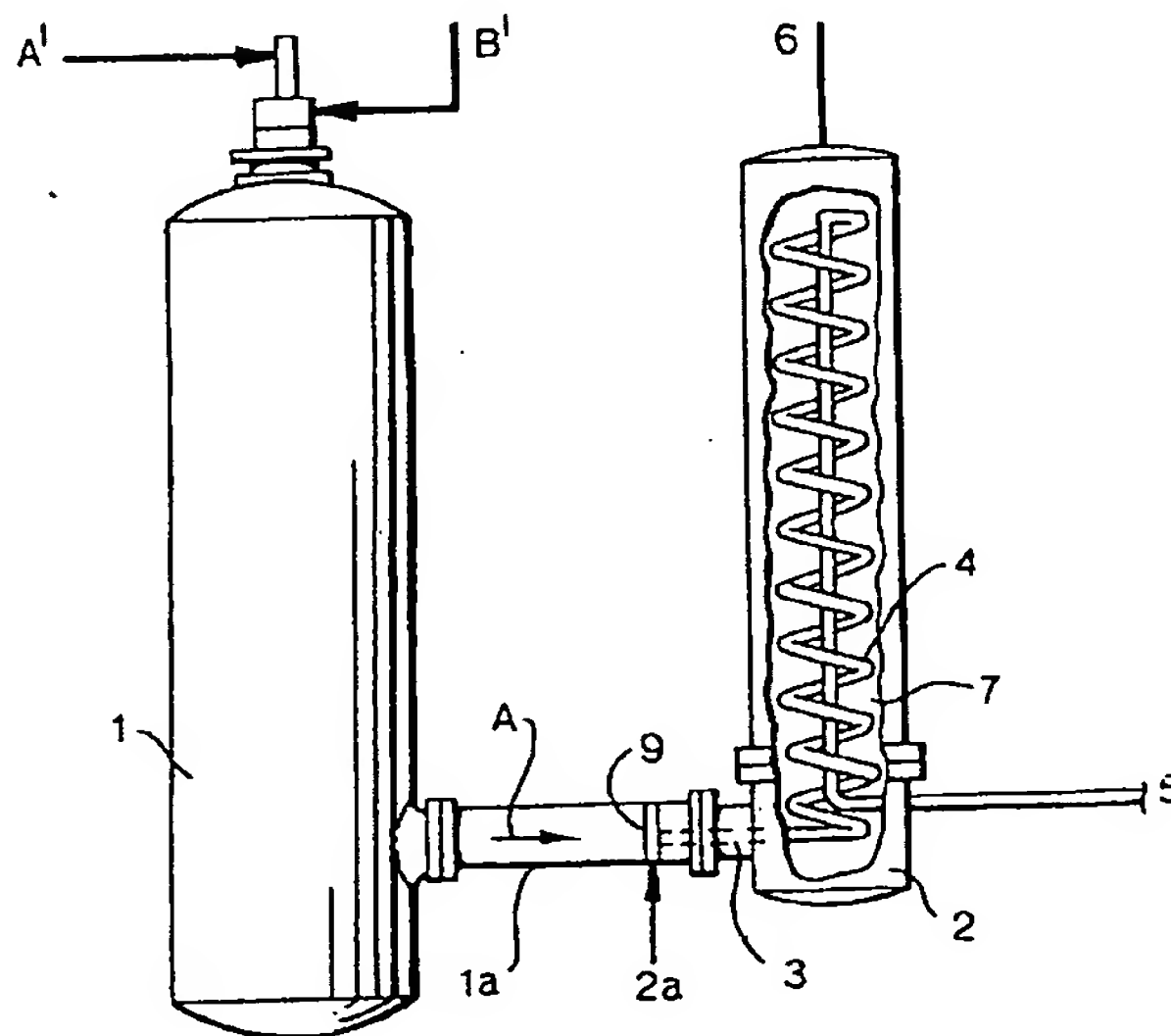
Gummersbach (DE). **VAN DER PLAS**, Tycho Agien
[NL/NL]; Badhuisweg 3, NL-1031 CM Amsterdam
(NL). **SCHMITZ-GOEB**, Manfred Heinrich [DE/DE];
Bunsenstrasse 5, 51647 Gummersbach (DE). **VOETEN**,
Edwin Bernardus Wilhelmus Gerardus [NL/NL]; Bad-
huisweg 3, NL-1031 CM Amsterdam (NL).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,

[Continued on next page]

(54) Title: APPARATUS AND PROCESS FOR COOLING HOT GAS



(57) Abstract: Process to cool hot gas by passing the hot gas through a tube having a main tubular part and an upstream tubular part, wherein (i) the exterior of main tubular part is cooled by an evaporating liquid cooling medium flowing freely around said tube, (ii) the upstream tubular part is cooled by passing fresh liquid cooling medium and a defined part of the liquid cooling medium of activity (i) along the exterior of the upstream end of the tube and (iii) wherein the mixture of fresh cooling medium and the defined part of the liquid medium after being used to cool the upstream tubular part is used in activity (i) as cooling medium.

WO 2005/015105 A1

WO 2005/015105 A1



SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*